

Training Course V

Title: US EPA's Guidelines for Health Risk Assessment of Chemical Mixtures

Instructors: Dr. Richard Hertzberg and Glenn Rice
US EPA ORD National Center for Environmental Assessment

Time: Friday 18 May 2001, 1:00-5:00 p.m.

Course objectives:

Provide training on EPA procedures for health risk assessment of exposure to chemical mixtures, their range of application, and their main assumptions and uncertainties.

Target audience:

Risk practitioners and others interested in methods for assessing mixtures risks, including evaluating mixture dose-response information and interpreting the resulting risk characterization. Some familiarity with methods for assessing health risks of single chemicals (e.g., US EPA or ATSDR methods) and basic toxicological concepts is helpful but not required.

Course description:

This workshop will provide a general overview of the new EPA mixtures risk guidance and its suggested procedures, a description of several new methods, and hands-on exercises during which participants will apply assessment procedures to test data sets. The US Environmental Protection Agency's Office of Research and Development, National Center for Environmental Assessment has recently authored supplementary guidance for the 1986 *Guidelines for Health Risk Assessment of Chemical Mixtures*. These two documents represent the primary US EPA methodology for assessing cumulative health risks from exposure to multiple chemicals. The recent guidance contains descriptions of current methods and an introduction of state-of-the-art approaches for addressing chemical mixtures risk. Included are: procedures and definitions for selecting among risk assessment methods; methods for using whole mixture data on a toxicologically similar mixture; development of an Interaction-Based Hazard Index using binary data on toxicologic interactions; a procedure for considering environmental transformations; a generalized relative potency factors procedure for mixtures involving classes of similar chemicals; and expanded discussions that clarify the uses of dose-addition and response-addition approaches.

Course outline:

- I. Introductory Material Hertzberg, 30 minutes
 - A. Introductions of participants
(background, current position, experience with mixtures risk assessment, expectations)
 - B. Workshop Structure, What's in the Notebooks
 - C. Guidelines History, Motivation, Level of Science Applied
 - D. Approach to Selecting a Risk Assessment Method
 - E. Key Definitions

- II. Exposure Issues for Mixtures Rice, 20 minutes
 - A. Environmental Transformations
 - B. Example adjustment for PCBs

- III. Whole Mixtures Methods Hertzberg, 35 minutes
 - A. Toxicity Values for Whole Mixtures

- B. Comparative Potency
- C. Hands-On Exercise
- D. Discussion

- IV. Additivity Methods (Response Addition, Dose Addition, Hazard Index) Rice, 35 minutes
 - A. Introduction of Methods, Assumptions, Calculations, Uncertainties
 - B. Hands-On Exercise
 - C. Discussion

Break *20 minutes*

- V. Relative Potency Factors Rice, 25 minutes
 - A. Introduction of Method, Assumptions, Calculations, Uncertainties
 - B. Hands-On Exercise
 - C. Discussion

- VI. Interaction-Based Hazard Index Hertzberg, 35 minutes
 - A. Introduction of Method, Assumptions, Calculations, Uncertainties
 - B. Hands-On Exercise
 - C. Discussion

- VII. Final Thoughts/Discussion/Questions Hertzberg/Rice, 30 minutes

Biographical sketches of instructors:

Richard C. Hertzberg holds a Ph.D. in biomathematics and chairs the EPA work group developing mixture risk assessment guidance for Agency-wide use. He is the senior scientist in EPA on mixtures risk assessment issues and is the EPA Project Officer of an interagency agreement with Argonne National Lab for developing screening guidance and a web site for cumulative risk assessment. Dr. Hertzberg works in the National Center for Environmental Assessment in EPA's Office of Research and Development, and is a principal investigator of mathematical methods for mixture risk assessment as well as multivariate graphical methods for data display and analysis.

Glenn Rice is an Environmental Health Scientist with the National Center for Environmental Assessment in EPA's Office of Research and Development. He is one of the primary authors of the EPA's Mercury Study Report to Congress, Multipathway Exposure Methodology, Chemical Mixtures Guidance as well as the draft Comparative Risk Framework Methodology. He holds a Master's Degree in Microbiology and is the Immediate Past-President of the Ohio Chapter for the Society of Risk Analysis.